

CLAIMS

The invention claimed is:

1. A trim press article handling apparatus, comprising:

a frame;

a punch carried by the frame;

a die carried by the frame and cooperating in relative movement with the punch to sever articles from a web;

a treadle carried for movement relative to the die, the treadle including a web guide member, a primary guide strip spaced from the guide member slightly greater than a thickness of the web, a secondary guide strip spaced from the guide member at least four thicknesses of the web and spaced apart from the primary guide strip, and an article detector carried by at least one of the primary guide strip and the secondary guide strip and operative to detect position of an article in the web by detecting the position of a protuberance in the web as the protuberance is conveyed between the primary guide strip and the secondary guide strip;

control circuitry communicating with the article detector and a drive motor operative to move the treadle, the control circuitry configured to receive an input signal from the article detector indicative of the position of a web-supported article relative to the punch and the die, and operative to control operation of the drive motor to synchronize movement of the web-supported article via controlled motion of the treadle; and

a drive wheel assembly for moving a web and articles, the drive wheel assembly comprising a pair of roller feed assemblies provided on opposed edges of a web,

wherein each of the roller feed assemblies comprises a knock lever mechanism having a lever arm and a follower wheel, the knock lever mechanism carried

by the treadle, the lever arm configured to contact the die as the treadle is moved towards a stationary platen carrying the die, and the follower wheel configured to retract from the respective drive wheel in response to contact of the lever arm with the die.

2. The article handling apparatus of claim 1, wherein the knock lever mechanism comprises a kinematic linkage having a center pivot with the lever arm provided at one end of the kinematic linkage and the follower wheel provided at an opposite end of the kinematic linkage.

3. The article handling apparatus of claim 2, wherein movement of the treadle toward the platen and die imparts contact of the lever arm with the platen that imparts retraction of the follower wheel away from the drive wheel that opens up a gap therebetween and releases a respective edge of a web carried therebetween to enable lateral adjustment of the web and articles when centering the articles during a severing operation.

4. A trim press article handling apparatus, comprising:
a frame;
a punch carried by the frame;
a die carried by the frame and cooperating in relative movement with the punch to sever articles from a web;
a treadle configured to move relative to the die;

a drive wheel assembly for moving the web and the articles, the drive wheel assembly comprising a pair of roller feed assemblies provided on opposed edges of the web; and

wherein each of the roller feed assemblies includes a knock lever mechanism having a lever arm and a follower wheel, the knock lever mechanism carried by the treadle, the lever arm configured to contact the die as the treadle is moved towards a stationary platen carrying the die, and the follower wheel configured to retract from the respective drive wheel in response to contact of the lever arm with the die.

5. The apparatus of claim 4, wherein the treadle comprises:

a web guide member;

a primary guide strip spaced from the web guide member by a distance that is greater than a thickness of the web; and

a secondary guide strip spaced from the web guide member by at least four thicknesses of the web and spaced apart from the primary guide strip.

6. The apparatus of claim 5, further comprising an article detector carried by at least one of the primary guide strip and the secondary guide strip and operative to detect a position of an article in the web by detecting a position of a protuberance in the web as the protuberance is conveyed between the primary guide strip and the secondary guide strip.

7. The apparatus of claim 5, wherein the secondary guide strip is configured to induce alignment of the articles with the web guide member.

8. The apparatus of claim 5, wherein the primary guide strip and the secondary guide strip are configured to be laterally adjusted relative to the web guide member to accommodate changes to different die configurations.

9. The apparatus of claim 5, wherein the primary guide strip and the secondary guide strip each comprise an attachment plate, the attachment plate comprising an adjustment collar having a lock arm configured to enable clamping and un-clamping of the adjustment collar.

10. A trim press article handling apparatus, comprising:

- a punch and a die carried by a frame, the die cooperating with the punch to sever articles from a web of thermoformable material;
- a treadle carried for movement relative to the die, the treadle including a web guide member, a primary guide strip disposed adjacent the web guide member, a secondary guide strip spaced from the guide member, and an article detector to detect a position of an article in the web;
- control circuitry communicating with the article detector, and a drive motor operative to move the treadle; and
- a drive wheel assembly for moving the web and the articles, the drive wheel assembly comprising a pair of roller feed assemblies provided on opposed edges of the web, wherein each of the roller feed assemblies comprises a knock lever mechanism having a lever arm and a follower wheel, the knock lever mechanism carried by the treadle, the lever arm configured to contact the die as the treadle is moved towards a stationary

platen carrying the die, and the follower wheel configured to retract from the respective drive wheel in response to contact of the lever arm with the die.

11. The apparatus of claim 10, wherein the article detector is carried by at least one of the primary guide strip and the secondary guide strip and operative to detect a position of an article in the web by detecting a position of a protuberance in the web as the protuberance is conveyed between the primary guide strip and the secondary guide strip.

12. The apparatus of claim 10, wherein the gap between the primary guide strip and the guide member is greater than a thickness of the web of material.

13. The apparatus of claim 10, wherein the second guide strip is spaced at least four thicknesses of the web and spaced apart from the primary guide strip.

14. The apparatus of claim 10, wherein the control circuitry is configured to receive an input signal from the article detector, the input signal being indicative of the position of an article relative to the punch and the die, the control circuitry being operative to control operation of the drive motor to synchronize movement of the article via controlled motion of the treadle.

15. An article handling apparatus for a trim press, comprising:

- a die and a cooperating punch configured to sever articles from a web;
- a treadle configured for movement relative to the die; and
- a drive wheel assembly configured to move the web and the articles, the drive wheel assembly having a pair of roller feed assemblies, each of the roller feed assemblies include a knock-lever mechanism having a lever arm and a follower wheel, the lever arm configured to contact the die as the treadle is moved towards the die, and the follower wheel configured to retract from the respective drive wheel in response to contact of the lever arm with the die.

16. The article handling apparatus of claim 15, wherein the knock-lever mechanism is carried by the treadle.

17. The article handling apparatus of claim 15, wherein the pair of roller feed assemblies are provided on opposite edges of the web.

18. The article handling apparatus of claim 15, wherein the treadle is configured to be moved towards a stationary platen carrying the die.

19. The article handling apparatus of claim 18, wherein movement of the treadle towards the platen and the die enables the lever arm to contact the platen thereby imparting retraction of the follower wheel away from the drive wheel to open up a gap therebetween and release a respective edge of the web carried therebetween.

20. The article handling apparatus of claim 19, wherein the opening of the gap enables lateral adjustment of the web and articles when centering the articles during a severing operation.

21. The article handling apparatus of claim 15, wherein the treadle comprises a web guide member, a primary guide strip disposed adjacent the web guide member, a secondary guide strip spaced from the guide member, and an article detector configured to detect a position of an article in the web.

22. The article handling apparatus of claim 21, wherein the primary guide strip is spaced from the web guide member by a distance that is greater than a thickness of the web.

23. The article handling apparatus of claim 21, wherein the second guide strip is spaced from the web guide member by at least four thicknesses of the web, and is laterally spaced apart from the primary guide strip.

24. The article handling apparatus of claim 21, wherein the article detector is carried by at least one of the primary guide strip and the secondary guide strip, and is operative to detect a position of the article by detecting a position of a protuberance in the web as the protuberance is conveyed between the primary guide strip and the secondary guide strip.

25. The article handling apparatus of claim 24, wherein the secondary guide strip is configured to induce alignment of the articles with the web guide member.

26. The article handling apparatus of claim 24, wherein the primary guide strip and the secondary guide strip are configured to be laterally adjusted relative to the web guide member to accommodate changes to different die configurations.

27. The article handling apparatus of claim 24, wherein the primary guide strip and the secondary guide strip each comprise an attachment plate, the attachment plate comprising an adjustment collar having a lock arm configured to enable clamping and release of the adjustment collar.

28. A trim press article handling apparatus, comprising:

- a punch and a die carried by a frame, the die cooperating with the punch to sever articles from a web of thermoformable material;
- a treadle configured to move relative to the die, the treadle including a web guide member, a primary guide strip disposed adjacent the web guide member, a secondary guide strip spaced from the guide member, and an article detector to detect a position of an article in the web;
- control circuitry communicating with the article detector; and
- a drive wheel assembly for moving a web and articles, the drive wheel assembly comprising a pair of roller feed assemblies, each of the roller feed assemblies includes a knock lever mechanism having a lever arm and a follower wheel, wherein a gap is formed between the follower wheel and the respective drive wheel in response to contact

of the lever arm with the die to release the web carried therebetween and to enable lateral centering of the articles carried in the web.

29. The trim press article handling apparatus of claim 28, further comprising a drive motor operative to move the treadle.

30. The trim press article handling apparatus of claim 28, wherein the roller feed assemblies are provided on opposed edges of the web.

31. The trim press article handling apparatus of claim 28, wherein the knock lever mechanism is carried by the treadle.

32. The trim press article handling apparatus of claim 28, wherein the lever arm is configured to contact the die as the treadle is moved towards a stationary platen carrying the die, and the follower wheel is configured to retract from the respective drive wheel in response to contact of the lever arm with the die to enable the lateral centering of the web.